



22 April 1992

PDX30702.PA.NP

Permits Issuance Section [W-5-1]
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Attention: Mr. Terry Oda
Mr. Doug Liden

Subject: Draft NPDES Permits for Pago Pago Joint Cannery Outfall
(In Reply to W-5-1)

Comments on the Draft NPDES permits for StarKist Samoa, Inc and VCS Samoa Packing Company are presented in the attached memorandum. CH2M HILL reviewed the draft permits as the consultant to both canneries. The comments on the draft permits are presented jointly by both canneries. If you have any questions on the attached material or need any additional information concerning the work performed by CH2M HILL for the canneries, please call me at your convenience.

Sincerely,

CH2M HILL

Steven L. Costa
Project Manager

attachment: Memorandum, Costa to Liden, 22 April 1992

cc: Pat Young/USEPA
Sheila Wiegman/ASEPA
Norman Wei/StarKist Seafood
James Cox/Van Camp Seafood
Maurice Callaghan/StarKist Samoa
Michael Macready/VCS Samoa Packing

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MEMORANDUM

CH2M HILL

TO: Doug Liden/USEPA

COPIES: Pat Young/USEPA
Sheila Wiegman/ASEPA
Norman Wei/StarKist Seafood
James Cox/Van Camp Seafood
Maurice Callaghan/StarKist Samoa
Michael Macready/VCS Samoa Packing

FROM: Steve Costa/CH2M HILL

DATE: 22 April 1992

SUBJECT: Comments on Draft NPDES Permits for Pago Pago Joint Cannery Outfall Operation

PROJECT: PDX30702.PA.NP

PURPOSE AND SCOPE OF COMMENTS

The draft NPDES permits for StarKist Samoa, Inc. (AS0000019) and VCS Samoa Packing Company (AS0000027) have been reviewed by Mr. Norman Wei of StarKist Seafood, Mr. James Cox of Van Camp Seafood, and Dr. Steven Costa of CH2M HILL. CH2M HILL is the canneries' consultant for permitting and environmental issues associated with the Joint Cannery Outfall in Pago Pago Harbor, American Samoa. This memorandum presents the comments of the canneries on the terms and conditions of the draft NPDES permits for discharge through the Joint Cannery Outfall.

COMMENTS ON SECTION A. EFFLUENT LIMITS AND MONITORING REQUIREMENTS

Monitoring for TP and TN. The monitoring schedule for TP and TN required for the option of counting non-production days requires monitoring for seven consecutive days (six days following the monitoring for a non-production day). The Statement of Basis indicates that the EPA suggested monitoring schedule "will ensure that the monitoring is representative of the discharge". We recognize that this is intended to be a conservative approach to protect water quality standards. However, we request the following points be considered:

- The approach used in the formulation and definition of the mixing zone was quite conservative.

- A review of the frequency distribution of TN and TP loadings shows a distribution skewed toward the high end. This means that an abbreviated sampling schedule (for example 40 percent of both production and non-production days) would be more likely to over estimate loading and would actually be more conservative (over the long term) than sampling every day.
- The cost of sampling additional days is significant (estimated to be approximately \$30,000 per year for each cannery).

The conservatism already built into the mixing zone and effluent limitations, the nature of the statistical description of the nutrient loadings, and the costs involved should be considered in specifying the sampling frequency. The rationale for sampling every day does not provide significant additional environmental protection, and may actually be less conservative than the weighted average approach previously suggested by the canneries.

We believe a weighted average procedure for production and non-production loadings would be sufficient to provide adequate protection of water quality standards. Such an approach would permit the canneries to account for lower loadings on nonproduction days at a reasonable increased sampling cost while at the same time maintaining the conservative approach to permitted nutrient loading levels desired by EPA. The canneries request that the sampling option for counting non-production day loadings be specified on a weighted average basis. A sampling schedule for this option of either a percentage of nonproduction days or all nonproduction days combined with the twice per week production day sampling is requested.

Monitoring Requirements for TRC. The frequency of monitoring listed in the two permits is inconsistent. Based on your response to my phone call of 16 April 1992 we understand that "once/6 months" is correct and both permits should reflect this value.

We understand that the effluent limitation on TRC applies at the discharge point. TRC concentrations at the available sampling location will not account for the anticipated quenching effects on TRC as it travels through the outfall. We suggest that a procedure for quenching tests to estimate the actual TRC in the discharge to the harbor be developed and that the results of these tests be used to determine if a problem with compliance with TRC standards exists.

A major problem with TRC is the difficulty of measuring it at low levels, which is compounded by turbidity, organic content, and, for StarKist, high sea water content. We request additional guidance from EPA as to the analytical procedures and instrumentation that will be acceptable. We request that EPA provide a description in the statement of basis, in the response to this comment, or in the permit, of an acceptable method for testing for TRC. The TRC testing should include quenching tests.

MEMORANDUM

Costa to Liden
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Monitoring Requirements for pH. In the previous permits granted to the canneries the pH effluent limitation included the condition that:

The total time during which the pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month; and no individual excursions from the range of pH values shall exceed 60 minutes.

The operation of the wastewater treatment facilities is based on monitoring and adjustment. The condition in the previous permits recognized the nature of the operations and allowed some response time to adjust to conditions that may be unforeseen or unavoidable. We request that this condition be retained in the present permit for the same reasons.

TN and TP Combined Loading. As described in the Statement of Basis, the canneries were permitted to allocate the combined loadings of TN and TP between themselves, given the total allowable loadings. The canneries would like to maintain an ongoing relationship of this kind where the total allowable loading is the criteria for determining violations of permit conditions. Under such an arrangement there would be no violation unless the total loading for both canneries is exceeded. If the total loading is exceeded then the individual cannery permit limits, as given in the draft permits, would be applied to determine which cannery is in violation. If both canneries exceeded permit limits then both would be in violation.

The discharge is through a single outfall and the mixing zone was based on combined loadings of TN and TP. An arrangement such as described above would not increase efforts for monitoring or enforcement. The total permitted discharge of nutrients would not be changed. The only effect would be to allow the canneries more flexibility. The suggested approach is consistent with the "bubble" concept accepted by EPA in other situations. The canneries request that this concept be applied to the joint cannery outfall permits.

COMMENTS ON SECTION B.
DISCHARGE SPECIFICATIONS

The language of the discharge specifications requires that monitoring done at the indicated sampling stations "shall not reveal" listed items in accordance with the American Samoa Water Quality Standards. Reference is not made to the responsibility of the canneries or the consequences to cannery operations if monitoring does reveal any of the listed items. If monitoring does reveal conditions not in accordance with American Samoa Water Quality Standards, and the canneries operations are not the cause, it is not clear what action will be taken by EPA. Examples that come to mind are effects of

nonpoint source and streamflow runoff events. Such effects are not under the control or influence of the canneries and would be temporary.

The permit section is titled "Discharge Specifications" and presumably refers to the canneries discharges. However, without any cause and effect considerations the intent of the section is vague. The level of information would be required from the canneries to demonstrate they did not cause a violations of American Samoa Water Quality Standards is not stated. The permits should address the action that EPA and the canneries would be expected to take if the canneries were not the cause of a violation of this section. The canneries request that the language of the permits be changed to indicate that the canneries would be responsible and violations would be possible only if the canneries were found to be responsible for the items listed.

COMMENTS ON SECTION C. PROTECTED AND PROHIBITED USES

We have the same concerns as expressed for Section B above. The canneries should not be held responsible for another party engaging in prohibited uses, or compromising protected uses, of Pago Pago Harbor. The language should be specific to the canneries discharge through the outfall.

COMMENTS ON SECTION D. TOXICITY

The canneries request that the language of the first sentence of Part 3 (Toxicity Reopener) be modified to add the word "materially" as shown below:

Should any of the monitoring indicate that the discharge causes, has reasonable potential to cause, or contributes materially to an excursion above a water quality criteria,

COMMENTS ON SECTION E. RECEIVING WATER QUALITY MONITORING PROGRAM

The intent of the monitoring program is to assess the impact of the canneries discharge on Pago Pago Harbor and to provide a means of verifying that water quality standards are being met. We understand the reason for the extent and location of the stations in the past. However, in the future we feel that only those stations at the edge of the mixing zone will be required. We feel that, if no problems are observed, the number of

stations can be greatly reduced after the first year of monitoring and the intent of the program can still be met.

If water quality standards are being met throughout the harbor then only those stations in and at the edge of the mixing zone are required to monitor the compliance of the canneries discharge with permit conditions. The canneries request that the permit indicate the possible modification or monitoring stations, with appropriate review, after the first year of monitoring.

COMMENTS ON SECTION F. DYE OR TRACER STUDIES

The requirement is to perform dye or tracer studies during the two oceanographic seasons. Therefore, the requirement to perform the first study within one month after approval of the study plan may not reflect the most appropriate timing. We suggest that the dates for the studies be determined during development of the study plans.

Based on the results of the first study it may be found that a second study would not be necessary. This could be because of acceptable plume model verification, verification of the conservatism built into the mixing zone and diffuser design criteria, or other conclusions from the first study. We suggest that the requirement of the second study be contingent on an assessment of the results of the first study.

COMMENTS ON SECTION G. SEDIMENT MONITORING

We do not believe that samples are required yearly to provide an understanding of sediment character changes in either the inner or the outer harbor. We suggest that the results of the first two years of monitoring be assessed. At that time the necessity of annual collections can be made. This could be handled by requiring an approved study plan for additional collections after the first two years with the sampling times to be specified in that plan.

COMMENTS ON SECTION H. EUTROPHICATION STUDY

We understand the rationale of the study but feel that the requirement regarding consideration of "phytoplankton species" at the end of the second sentence is vague. We do not believe that the intent is to construct response curves for individual species, but rather to look at the response of the existing phytoplankton communities in the harbor to nutrient loads.

MEMORANDUM

Costa to Liden

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**COMMENTS ON SECTION I.
CORAL REEF SURVEY**

The requirement specifies both annual and biannual surveys. We understand that surveys every two years is the intended requirement. However, we feel that surveys should be less frequent to detect meaningful differences. We suggest that the timing of surveys be based on results of previous surveys. The first survey would be done as stated and the following survey would be done at a time, specified in a revised study plan, determined after review of the results of the first survey.

**COMMENTS ON SECTION J.
VERIFICATION OF MODEL PREDICTIONS**

The canneries wish to provide the information requested as efficiently as possible. Some formal coordination is probably required to do this. We suggest that a study plan be required and approved prior to doing the modeling and model verification. This will provide a basis on which the adequacy of the work done can be judged.

Sheila - I re-wrote Doug's
rough draft. Couple places need work.

Revised 8/3/92
Mike Lee also going
to add his 2¢. Your comments
were incorporated. Any other comments
df

Response to Comments

VCS Samoa Packing Company
NPDES Permit No. AS0000028

Star Kist Samoa, Inc.
NPDES Permit No. AS0000019

Comments on the draft permits for this facility were received from the dischargers through their consultant, CH2MHill, on April 22, 1992. These comments pertained to both permits and will be addressed together.

Section A. Effluent Limits and Monitoring Requirements

1. Monitoring for Total Nitrogen (TN) and Total Phosphorus (TP)

The canneries' comments related to the monitoring schedule in the draft permit for monthly averages for TN and TP which provided the option of counting non-production day discharges by requiring seven consecutive days of monitoring (six days following the monitoring of a non-production day). It was suggested that this approach was overly conservative, expensive, and that a weighted average procedure be used in calculating production and non-production day loadings for monthly averages.

Response: The method proposed in the draft permit for monitoring and calculating monthly averages for TN and TP is straight-forward (i.e. all sampling days are totaled and averaged and does not use weighted averages) and yet still allows the canneries to account for non-production days in order to lower their monthly average if necessary. Thus, the monitoring requirement will stand as is.

Should the canneries consistently comply with their TN and TP limits and should the monitoring data show that the discharge is not significantly affecting the water quality in the harbor or causing receiving water quality violations, the permit may be modified to incorporate a "weighted average" method of measuring compliance with the limitations. The numerical limitations themselves shall not be made any less stringent.

2. Monitoring Requirements for Total Residual Chlorine (TRC)

The canneries commented that the TRC limit did not account for quenching effects on TRC as it travels through the outfall. They requested that procedures be developed to test these effects and the results used to determine if a compliance problem with TRC standards in the receiving waters exists. Additionally, guidance was requested from USEPA on acceptable analytical procedures and instrumentation for measuring such low levels of TRC.

Response: The USEPA's Environmental Support Branch (ESB)

was consulted and based on their recommendation, the TRC monitoring requirement has been removed from the permit. In ESB's opinion, the quenching effect and high organic content of the effluent, as well as the salinity of the effluent and receiving waters, would result in a negligible amount of TRC discharged into the harbor. However, the TRC limitation, which is based on the American Samoa Water Quality Standards, is still in effect. (DOES THIS MEAN THAT THE PERMIT WILL STILL HAVE TRC LISTED? IS THAT POSSIBLE?) This permit may be reopened for the inclusion of such a monitoring requirement should a ?????????

3. Monitoring Requirements for pH

As requested, the condition regarding monitoring requirements for pH which was included in the previous permits, will be retained in the present permits.

4. Total Nitrogen (TN) and Total Phosphorus (TP) Combined Loading

The canneries requested that total allowable loading for TN and TP in the mixing zone be used as the criteria for determining violations of permit conditions for these parameters. (A similar method, the "bubble approach", was employed in these permits by allowing the canneries to effectively determine their own limitations by allocating the total end-of-pipe limitations for nutrients.) Under such an arrangement there would be no violation unless the total loading for both canneries was exceeded.

Response. Although the canneries share a joint outfall and zone of mixing, each cannery is being issued its own NPDES permit, and thus is responsible for meeting the limitations described in its individual permit. For enforcement purposes, each permit must stand as an independent contract, otherwise the canneries would be required to conduct their monitoring activities simultaneously. ?????I THINK THIS PART NEEDS BEEFING UP. MIKE, ANY WORDS.....

Section B. Discharge Specifications

The canneries expressed concern that the receiving water monitoring discharge "shall not reveal" specifications for certain parameters was vague, and that the permits implied that the canneries would be held responsible for violations of water quality if the monitoring revealed any of the listed items, without consideration of other pollutant sources such as nonpoint sources, stream runoff, etc.

Response. While we agree that the canneries should not be held responsible for ambient excursions above water quality standards that are in no way linked to the canneries' discharge, the canneries are responsible for providing proof

that their discharges are not responsible for such excursions. Such clarifying language has been added to the permit.

Section C. Protected and Prohibited Uses

The canneries felt that the permit language should specify that this section applied to their discharge as they should not be held responsible for other parties engaging in prohibited uses or compromising the protected uses of the harbor.

Response. The canneries are not held responsible for another party engaging in prohibited uses, except where the other party is somehow linked to the cannery (example, tuna vessels engaging in illicit activity.) IS THIS TRUE CAN THE CANNERY BE HELD RESPONSIBLE? Such language clarifying the canneries' responsibilities has been added.

Section D. Toxicity

The canneries requested that the language of the first sentence of Part 3 (Toxicity Reopener) to modified to add the word "materially", so that it would read, "Should any of the monitoring indicate that the discharge causes, has reasonable potential to cause, or contributes materially to an excursion above a water quality criteria,...."

Response. The language in the proposed permit is a direct implementation of American Samoa's water quality standards. The language shall remain as stated.

Section E. Receiving Water Quality Monitoring Program

The canneries requested that the permit include the possibility of possible modification/elimination of monitoring stations, with appropriate review, after the first year of monitoring. They felt that if the first year of monitoring indicated that water quality standards were being met throughout the harbor, then only those stations in and at the edge of the mixing zone would be needed to monitor compliance.

Response. The reason for the dischargers' comment is not clear. Since ASEPA collects the samples and not the discharger, the discharger should have little concern over how many monitoring stations exist. Moreover, the number and location of stations is important to assess the cause of a water quality exceedance and to assess farfield dilution. Therefore, a greater number of stations would seem to be beneficial to the canneries and provide a good defense should water quality violations be found.

However, the language of the permit will be changed to

include consideration of modification of the monitoring stations after a year of monitoring. Due to the canneries' historical loading, however, stations will still be required in the Inner Harbor and in the Outer Harbor beyond the mixing zone.

Section F. Dye or Tracer Studies

The canneries suggested that the dates for these studies be determined during development of the study plans so that the studies would be conducted at the appropriate time, during the two distinct oceanographic seasons. They also suggested that the second study requirement be contingent upon an assessment of the first study's results.

Response. We agree with the rationale behind determining the date of the dye study during the development of the study plan. However, the date must be approved by ASEPA and USEPA and is to occur no later than six months after the issuance of this permit.

A second study shall be required regardless of the results of the first study. The purpose of these studies is to evaluate the two extreme conditions (i.e. no current and a current towards the coral reef.) One study would not be enough to ascertain two such conditions.

Section G. Sediment Monitoring

The canneries felt that yearly sediment sample studies were necessary and suggested that the results of the first two years of monitoring be assessed and the necessity of annual sampling be determined at that time.

Response. We agree with this suggestion and the permit language has been revised accordingly.

Section H. Eutrophication Study

As per the canneries' comment, the phrase "phytoplankton species" has been clarified to "phytoplankton communities".

Section I. Coral Reef Survey

The canneries suggested less frequent coral reef surveys be undertaken in order to detect meaningful differences and that a revised study plan should be made after the first survey, which would specify the timing of the subsequent surveys.

Response. The intent of this requirement was to provide baseline data and two subsequent surveys for comparison over the period of the permits (5 years). Thus, the first survey should be done as stated (within the first year of permit

issuance) and the next study should be performed within two years of the first study and biannually thereafter.

Section J. Verification of Model Predictions

The canneries' suggestion requiring a study plan be approved to verify model predictions will be incorporated in the permit. This will ensure coordination between all parties and that all needs are met meaningfully.

08/04/92

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US EPA

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CHM HILL

DATE: 3 March 1992

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REMARKS:

Pat,

FYI: material sent to Doug Liden re: NPDES Draft Permits (preliminary)
Please copy Norman Lovelace. Give me a call if you have any questions

Thanks, Steve

Doug,

Attached are comments on the preliminary draft of the canneries NPDES
permits. Please give me a call with any questions and to set up a
meeting, if you think it is necessary.

Regards,

Steve

*Pat
Keep/Toss*

Date Fax Received: _____
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MEMORANDUM**CH2M HILL**

TO: Doug Liden/USEPA

COPIES: Norman Wei/StarKist Seafood
James Cox/Van Camp Seafood
Norman Lovelace/USEPA
Pat Young/USEPA
Sheila Wiegman/ASEPA

FROM: Steve Costa/CH2M HILL/SFO

DATE: 3 March 1992

SUBJECT: Comments on Preliminary Draft NPDES Permits:
Joint Cannery Outfall, Pago Pago Harbor, American Samoa

PROJECT: PDX30702.PA.NP

A preliminary review of the draft NPDES permits for both canneries indicates that a number of items include areas for further discussion with USEPA and ASEPA. The list below does not include the flow limitation on Samoa Packing which is being addressed separately. I am available for a meeting with you, prior to the public release of the draft permit, to discuss any or all of the issues discussed below.

The issues involving effluent limits and monitoring have been discussed, or indicated as areas of concern, prior to the review of this draft. Some of the language in the draft permit, particularly under Discharge Specifications (Section B), is of extreme concern and represent major problems with the draft permit. If the permit language is left as is the canneries would be in violation of permit conditions at the time the permit becomes effective. The specification of end of pipe limitations does not consider the existence of, or rationale for, a zone of mixing.

The number and complexity of the studies requested was surprising and appears onerous and costly. As environmental consultants for the canneries, we cannot justify the necessity for all of the studies proposed in the preliminary draft permit. These studies are discussed below in the list of issues we believe require further consideration.

A. EFFLUENT LIMITS AND MONITORING REQUIREMENTS

[1] Monitoring for TN and TP is described as a choice of two options:

- monitoring twice weekly on production days, or
- if the canneries wish to monitor on a non-production day, then monitoring will be done for six consecutive days following the non-production day.

Regardless of the option used all samples taken during the month will be used in calculating the "monthly average".

The first of the monitoring schedules (twice/week) provides a high (conservative) estimate of monthly average loading since the calculated average will not account for reduced loadings on non-productions days.

The second of the monitoring options provides for accounting for the reduced loadings on non-production days. The rationale behind this approach recognizes the slow response time Pago Pago Harbor and the fact that variability in the overall harbor concentrations of TN and TP will not be measurably influenced by daily variations in loading. Therefore reduced loadings on non-production days can be balanced with increases in loadings on production days without violations of water quality standards. We agree with the rationale for this option. However, the manner in which it is presented requires 7 days of monitoring each week if non-production days are to be accounted for. This would effectively require continuous monitoring, both non-production and production days, to account for any non-production day loadings.

We feel that it is not necessary to require what is effectively continuous monitoring (every day of the month) in order to account for non-production days. There are a variety of alternate monitoring approaches that could be used. We recommend either of the following to reduce the number of days of required sampling:

- Sample twice per week during production days and on every non-production day that the canneries desire to count in the

monthly average. Use a weighted average to calculate monthly loadings.

- Sample approximately 40 percent of the non-production days (to match the twice per week production day sampling frequency) and use a weighted average to calculate monthly loadings.

We realize the monitoring schedule proposed by EPA is a conservative approach and provides for the use of non-production day monitoring data under the most conservative conditions. The approach appears to be one of not allowing any low values to be averaged into the loading calculation unless all days are accounted for. This is apparently done to insure that there is no possibility of calculating a number that is not equal to or higher than the actual average. This element of conservatism is unwarranted given the conservative assumptions that have been used during the development of the zone of mixing and the conservative nature of the loading limitations proposed in the draft (preliminary) permit compared to the predictions of the models used. It is not necessary to place a third level of conservatism on top of the already conservative approach.

The existing data base provides a good characterization of the distribution of production day loadings. The distribution approximates a random distribution except near the high end. Therefore, the use of either of the two sampling schemes suggested above is highly unlikely to result in an underestimate of monthly average loading for any given month, and will not result in underestimates over periods of a few months or more.

- [2] Ammonia limits are based on two samples (one from each cannery). The limit proposed is prudent (based on a factor of approximately two higher than measured for a 30 second maximum exposure time for entrained organisms) for preliminary purposes. However, the actual concentration should be monitored and reported for a period of time (1 year or more) prior to the setting of discharge limits. We also feel that additional information on the behavior of ammonia, in the type of effluent discharged and in a marine receiving water environment, would result in a lower level of concern with potential toxic effects.

- [3] **Total Residual Chlorine (TRC):** The zone of initial dilution (ZID) should provide for TRC limitations. TRC limitations should be applied at the edge of the ZID rather than the end of the pipe. Chlorine is required in processing and it is not feasible to modify the process. Nor is it feasible to routinely dechlorinate in a setting such as American Samoa where shipping, storage, and technical capabilities are not always adequate.

The previous discussions with USEPA and ASEPA concerning a ZID for un-ionized ammonia should apply to TRC as well (see meeting notes for 26 Dec 1991 meeting). The American Samoa Water Quality Standards allow a zone of initial dilution and zone of mixing. The initial dilution process is very rapid and high dilutions are achieved and exposure times to entrained organisms can be maintained on the order of seconds to a few minutes with sufficient dilution to achieve concentrations below defined chronic levels.

A major additional problem with TRC is the difficulty of measuring TRC at low levels. This problem is compounded by the turbidity, high organic content, and (for Starkist) the high sea water content of the effluent. Discussions with the leading instrument manufacturer (HACH INSTRUMENTS) indicates that sophisticated and carefully done laboratory techniques will be required. There appears to be no instrument that will reliably or accurately measure the levels of TRC in the effluent.

Additional information on the behavior of residual chlorine in the high organic content effluent discharged and in a marine receiving water environment is needed to adequately assess the potential levels of TRC at the end of the pipe and the edge of a ZID. Such information would probably result in a lower level of concern with potential toxic effects.

B. DISCHARGE SPECIFICATIONS

- [1] **Dissolved oxygen** limits at the end of the pipe is a serious problem. This is an end of pipe requirement as it is written. We have no measurements of DO at end of pipe with the new outfall but do know that this condition will not be met at the end of pipe. The high oxygen demand and longer travel time through the pipe, particularly under low effluent flows, should be considered. We feel that the DO requirement

must account for the establishment of the mixing zone. This was recognized in the preparation of the application for the zone of mixing (see Table 3 in the application). The establishment and approval of a zone of mixing has been the basis for the construction of the extended joint cannery outfall. The application of end of pipe limitations of this type is counter to the conditions and understanding which form the basis from which the joint cannery outfall project has been undertaken.

- [2] Similar comments for turbidity as for DO above.
- [3] Toxicity is also written as an end of pipe requirement. We feel that the requirement should be at the edge of the zone of mixing or a ZID established for specified constituents of concern (the ZID may need to be specified).

C. TOXICITY

We have some questions concerning the schedule, holding times for effluent if the tests are done off island, whether or not they can be done on island, and how representative the tests can be in either case. In particular, the problem of holding time of effluent samples needs to be addressed. Are constituents of concern stable, and is the generation of other constituents during shipping effluent samples a potential problem?

We understand the reasons for the tests but believe that more information and better defined procedures are required prior to starting the tests. Therefore, we would recommend an initial period of development of site specific objectives, protocols, and procedures. An assessment of the usefulness of the tests and addressing whether they can be conducted in a meaningful fashion is indicated. The first test in 90 days appears unrealistic and we urge a development period prior to initiating the testing.

D. RECEIVING WATER QUALITY MONITORING PROGRAM

- [1] Additional stations around the zone of mixing zone are reasonable but the elimination of some of the other stations should be considered. Since the discharge will be moved out of the inner harbor, the spacial detail in the inner harbor is not necessary and the number of stations in

the inner harbor can be reduced. Stations 12, 11a, 9a, 8, and 8a appear either redundant with the new stations or are not required to assess impacts of the new discharge location.

- [2] Measuring un-ionized ammonia is indirect (measure ammonia and calculate un-ionized ammonia). As far as I know, there are no well recognized equilibrium constants for sea water.

E. DYE OR TRACER STUDIES

Quarterly studies are not needed. One study to calibrate and verify models and to document diffuser performance is sufficient. At most two studies at the two different oceanographic conditions should be considered. However, it is our opinion that the additional information gathered during a second test would be of marginal value.

We perform dye studies routinely for a wide variety of discharges, they are costly and labor intensive. A single study is generally all that is required. Such studies are almost always used for verification and more than one is redundant and is not necessary.

F. SEDIMENT MONITORING

The sediment monitoring should be combined with the water quality monitoring and samples collected at the same time as the water samples during the selected month of the year. Attention needs to be given to the analysis techniques and the conclusions drawn from the data. For example: measurement of total phosphorous in sediments will include both organic and inorganic sources and have little relationship to the information desired.

G. EUTROPHICATION STUDY

We feel that the eutrophication study may not be practical and it may not be technically or economically feasible to conduct such a study to the level required to provide direct and meaningful information about the impact of the cannery discharges. We feel that the monitoring program addresses the same questions and provides direct information about the impacts of the cannery discharges.

H. CORAL REEF SURVEY

We see two problems with the coral reef survey as described:

- The time frame requested (annual) is probably not necessary and changes may not be readily observable with respect to the influences of the cannery discharge on that time scale.
- The number of transects is too limited to attempt to separate impacts due to specific localized causes.

We suggest one survey after three to five years be done for transects throughout the harbor. This will provide a better assessment of impacts and a more reasonable chance of isolating the reasons for particular changes.

I. HARBOR-WIDE CIRCULATION STUDY

To do a circulation study that will add any significant knowledge will be extremely complex and costly. We see no reason to simply gather additional data, which is what the study description indicates is required. As described in the Feasibility Study, the circulation is predominantly wind driven. To significantly increase understanding of the circulation will require an extensive field data collection and modeling effort (costs estimated at \$300,000 to \$500,000). To simply do a few more drogue releases and put in a few current meters for a short period would not add any significant knowledge about the circulation, flushing, and dispersion in the harbor. Analysis of the results of the monitoring program are more valuable in terms of understanding the circulation in the harbor than a repetition of previous current studies.